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Abstract

Internet commerce has been greeted with much excitement in the popular, practitioner and researcher literature over its brief lifetime. Many firms fervently pursued Internet commerce based business models in the belief that the initial costs would be justified by future returns. The "tech wreck" of early 2000 saw a sudden drop in ecommerce uptake. Only a limited amount of research has examined managerial expectations regarding adoption of this technology, especially after the crash of 2000. This study examines such post-crash expectations of managers of Australian companies regarding Internet commerce adoption. Based on literature analysis, it proposes a set of business expectations from technology adoption, these being the desire to gain a competitive advantage, to remove a competitive disadvantage, improve communication, reduce organisational costs and improve functionality. The study finds that, in the short and long term, managers still hope to acquire a competitive advantage and to benefit from improved communication with customers and shareholders. The results also suggest that managers are optimistic about functionality improvements in the long term but that some scepticism may have emerged regarding other benefits purportedly obtainable from Internet e-commerce adoption.

Introduction

Internet commerce is a technology that came to prominence in the research and popular literature in the mid to late 1990s. Many firms adopted it either to supplement existing operations or as a business approach in its own right. Internet technology could ostensibly change the way organisations communicate with customers and the wider community, allowing organisations to establish customer loyalty by facilitating one-on-one communication (Gonsalves et al. 1999) and alleviating the geographical limitations of conventional commerce (Teo et al. 1998, Adamic and Huberman 2000). Garfinkel and Spafford (1997) argue that the adoption of internet technologies can lower communication costs, which may improve customer loyalty, allowing these firms to garner higher profits from repeat customers.

Despite popular advocacy of the technology, many "dot-com" firms failed, notably towards the end of 2000 (Sivy 2001). Authors in the popular literature propose a number of reasons for this, including the use of fashionable but fickle business approaches (McCausland 2002), poor business models (Sivy 2001), unreliable customer bases (McCausland 2002), unworkable debt management (Lindsay 2002), and a lack of proven product or product management skills (Arensman 2002). The lack of financial revenue or viable business models did not seem to deter new adopters: in the words of Sivy (2001:106),

> "*The most flamboyant was the dot-com debacle. Bewitched by the Internet, venture capitalists, banks and ordinary investors were prepared to put money*

> *into almost any online business that attracted lots of customers. Dot-com shares traded almost entirely on the strength of revenue trends rather than earnings. Most dot-coms, in fact, had no earnings."*

While authors such as Hitchin (2002) have offered lessons for business from this tumultuous period, there has been little published empirical research into how contemporary adopters are dealing with Internet technology after the crash of 2000. Undoubtedly many may be somewhat soured by these events. However the research community stands to learn much from them. An analysis of Internet commerce using theory from more traditional systems literature may assist researchers in understanding the idiosyncrasies of the technology now that much of the original market hype has evaporated. Importantly, researchers can see whether or not similar expectations from technology adoption still apply under rather more adverse conditions. It offers a chance to re-evaluate the extant research literature on the reasons for IT adoption in times of adversity, and could provide some insight into why firms might persist in adopting a technology whose previous allure may have diminished significantly.

The motivations and expectations of managers towards new technologies are important since they not only drive whether and when these technologies are adopted, but also how and to what ends they are applied. If, therefore, the expectations of business managers towards Internet commerce and its supporting technologies have changed in the post "tech wreck" environment, then the designers, vendors and implementers of these technologies will need to know about and address the new directions and concerns that have emerged. Accordingly, this study aims to address the following research question:

What are the post "tech-wreck" managerial expectations regarding Internet technology adoption by Australian firms?

The remainder of the paper is structured as follows. The next two sections briefly discuss electronic commerce from a technology adoption perspective and present the hypotheses investigated. The section following that discusses the research method, and this is itself followed by the results and related discussion. Finally, a discussion of limitations and future research concludes the paper.

Electronic Commerce and Internet Commerce

The term "electronic commerce" has been used to include technologies such as EDI and electronic funds transfer as well as Internet based commerce. This study, however, focuses specifically on Internet commerce. Poon and Swatman (1999b:21) derive their definition of Internet commerce from Zwass (1996): "the sharing of business information, maintaining business relationships, and conducting business transactions by means of Internet-based technology". The technology is also useful for communicating with customers (Ranganathan and Grandon, 2002; Nemati and Barko, 2002) and suppliers (Nemati and Barko, 2002).

The adoption of this technology, however, is not necessarily straightforward. The marketing literature has devoted much coverage to consumer decision-making under conditions of uncertainty (e.g. Hauser and Urban, 1979; Bettman et al., 1998). However there is precious little literature on managerial approaches to technology adoption in situations where environmental and other indicators are confounding or pessimistic. Additionally, management intention may vary over the short, medium and long term (Marshall and McKay, 2002) as perceptions change and consumers adjust to novel risk effects (Bhatnagar et al., 2000). Small business, in particular, may be unable to justify long-term adoption given meagre short-term benefits (Poon and Swatman, 1999a). Managers may be swept up in the hype of an innovation (Abrahamson and Rosenkopf, 1993), as the lessons from prior innovations are not properly

assimilated (Bikchandani et al., 1998). An examination of Internet commerce should ideally take these issues into account.

Reasons for Information Technology Adoption

The research literature proposes numerous reasons for technology adoption. Swanson (1994), Tornatzky and Klein (1982), and Downs and Mohr (1976) all argue that researchers have often been confused between the strong order *reasons* for adoption, and the *facilitators* of adoption. While facilitators or secondary considerations of adoption are of considerable interest in themselves, this study focuses on the following reasons drawn from the literature, rather than facilitators.

Gaining a Competitive Advantage

Porter and Millar (1985) argue that information technology creates competitive advantage by offering adopters "new ways to outperform their rivals", allowing companies to provide superior goods and services to those of competitors. Bakos and Treacy (1986) and Earl (1987) similarly assert that information technology can be applied in a strategic fashion to obtain a competitive advantage.

Increasingly, competitive advantage has become associated with "innovators" or "first-movers" (Phan, 2003; Norton and Bass, 1987) although it is likely that there are limitations to the competitive advantage that can be derived from a given technology if much of the market has already adopted it. In this vein, for example, Fichman and Kemerer (1997) argue that "followers", "imitators" or subsequent adopters of an object-oriented systems approach may be subject to serious disadvantages because they fail to adopt early in the technology life cycle.

This leads to the following research hypothesis:

H1: Managers believed Internet commerce would help their firm gain competitive advantage.

Reducing Competitive Disadvantage

Swanson (1994) argues that, while firms may adopt a technology in an attempt to gain a competitive advantage, they may also adopt the technology in an attempt to remove a competitive *dis*advantage. Teo et al. (1998) observe that business adoption of the Internet in Singapore is an attempt to access larger markets and subsequently create an advantage over geographically limited competitors, while at the same time reducing some of the competitive pressure from other firms.

While it may be argued that reducing competitive disadvantage is simply gaining competitive advantage expressed in different terms, we argue that this is not necessarily so. For example, it may be that a firm, in adopting Internet commerce, acquires a competitive advantage (and believes beforehand, rightly, that this is likely to be achievable) but the advantage leads to or supports a position of dominance such that other competing firms, even if they were to similarly adopt Internet commerce, would not be able to reduce their now more disadvantaged state. Such an effect may indeed have been present in relation to Intel's adoption of Internet commerce, as described in Phan (2003).

This leads to the following research hypothesis:

H2: Managers believed Internet commerce would help their firm reduce competitive disadvantage.

Managing the Value Chain

Porter and Millar (1985) argue that information technology affects every point in an organisation's value chain, including internal and external linkages. Sakkas et al. (1999) argue that information technology tools facilitate information sharing throughout an organisation's value chain and the development of more complex and efficient business structures. Chatfield and Bjorn-Andersen (1997) argue that the adoption of technology by Japan Airlines allowed the organisation to improve their competitive position by improving the benefits derived from their value chain. They also contend that the adoption of inter-organisational systems (IOS) will have significant impacts upon value chain management as well as the relationships within the value chain. Lee (1998) argues that the lower cost of the Internet and the larger user base would encourage organisations to adopt Internet based methods of inter-business communication and supply chain management. Indeed it is commonly asserted that Internet-based supply chain management has resulted in dramatic cost reductions, increased efficiencies and resulting increases in profit (e.g. Lancioni et al, 2003). Johnston and Mak (2000) argue that the Internet can facilitate universal electronic compliance among a community of trading partners who may be diverse in their levels of sophistication. They argue that the Internet overcomes some of the limitations of other communication technologies such as Electronic Data Interchange (EDI).

These ideas lead to the following research hypotheses:

$H3^a$: Managers adopted Internet commerce to improve communication with their customers.

$H3^b$: Managers adopted Internet commerce to improve communication with their suppliers.

$H3^c$: Managers adopted Internet commerce to improve communication with their shareholders.

$H3^d$: Managers adopted Internet commerce to improve communication with their competitors.

Reducing Costs

The IS literature frequently associates the adoption of technology with reduced costs. Earl (1989) argues that IT adoption can contribute to the reduction of organisational costs in attempts to establish a cost leadership strategy. Chircu and Kauffman (2000), and Coltman et al. (2001) concur. Tan and Teo (1998) find lower operational costs to be a significant contributor in Internet adoption. Igbaria et al. (1996) argue that Decision Support System (DSS) adoption has contributed to both time and money savings for the Westland Co-operative Dairy Company Limited.

Kelley (1994) found that adopting a technology allows organisations to make significant efficiency gains by reducing resource costs. Porter and Millar (1985) argue that technology allows an organisation to deliver a product or service with greater levels of information support, and hence a product that is more effective for customers. Scudder and Kucic (1991) argue that the adoption of technology and the associated cost reduction and service quality improvements can be classified as productivity gains. Burt and Sparks (2003) suggest that there is evidence of electronic commerce delivering business efficiencies through cost reductions in the world of retail commerce, at least with respect to the world's largest retailers. Hitt and Brynjolfsson (1996) and Devaraj and Kohli (2000) found a positive relationship between technology adoption and organisational productivity.

This leads to the following research hypotheses:

$H4^a$: Managers adopted Internet commerce to reduce overall organisational costs.

$H4^b$: Managers adopted Internet commerce to reduce the cost of recruiting staff.

H4[c]: Managers adopted Internet commerce to reduce the cost of marketing their product range.

H4[d]: Managers adopted Internet commerce to reduce the cost of marketing their service range.

Improving Functionality

Norton and Bass (1987) argue that new technologies allow the development of new products not previously feasible, typically information intensive ones. Birch and Young (1997) argue that Internet adoption throughout the financial sector will require continuously rapid product innovation and service delivery so that an organisation can maintain a competitive advantage over market competitors. McGrath et al. (1996) argue that organisations will be able to develop competencies that they could not perform before the innovation attempt, including new ways of applying resources or the use of alternative production routines. The adoption of an innovation and the development of new competencies are argued to facilitate the development and implementation of new products and services, and improve resource functionality (Sethi and King, 1994). Indeed, Kickul and Gundry (2001) argue that e-commerce opens the door to innovative management processes and it is these that foster creativity and the ability to recognize and take advantage of marketplace opportunities through the development of new products and services.

This leads to the following research hypothesis:

H5: Managers perceived Internet commerce would allow their firms to develop new functionality with existing resources

Research Method

This study investigates the relationship between firm managers and information technology across a geographically disparate region. Further, a holistic view (Avison and Fitzgerald 1995) of electronic commerce was sought. This suggested that a survey approach would be most suitable. The survey instrument is well suited for obtaining insights into particular, situations, views and practices at a particular point in time while also allowing the researcher to examine a substantial number of research variables (Galliers 1992).

Population Definition and Analysis

Three requirements were placed on the population of businesses. First, the organisation had to be of a purely public nature and listed on the Australian Stock Exchange (ASX). Bretschneider and Wittmer (1993) and Yetton (1994) present evidence that governmental organisations have idiosyncratic characteristics, especially with regard to their structure and operation. Further, the inclusion of organisations that publicly released operating information beyond that derived through survey implementation would facilitate greater exploration of Internet commerce. A list of all currently listed companies was obtained from the ASX website.

The second requirement was that the firm had to have adopted some form of electronic commerce. The initial step was to search through the company's annual reports to see if they listed an Internet address for the firm. If an address was not found, the next step was to first search the ASX company listings database and then the Yahoo and Altavista Internet search engines. In both cases, the organisation's name and ticker code were typed in the search box, and results reviewed. No domain limitations were imposed, so as to catch those Australian companies that maintained top level domains outside of the ".au" suffix. Interestingly, a

number of organisations were found that listed an incorrect Internet address or directed the researcher to a website that did not exist.

The third requirement was that the firm had to be Australian-owned. Foreign companies were excluded so as to reduce possible geographical biases in the research. This screening involved searching through the organisations' websites for a mailing address. If a mailing address was not found, the ASX database was again examined for company details. In all cases, the Head Office was selected for correspondence. The mailing addresses were then checked to ensure they were Australian. Where an organisation was found to have its Head Office outside of Australia, it was removed form the population.

The final population consisted of Australian non-governmental organisations that had adopted Internet commerce, yielding a set of 588 companies. All eligible population members were included in the sample.

Instrument Development

The content and structure of survey questions is critical to the success of the study (Fowler 1988). This was borne in mind in three ways. First, the literature was searched for existing questions that had previously been used with success. Where a survey instrument could not be found, new questions were written and pre-tested.

Second, in order to capture the effects of implementation lag (Brynjolfsson 1993 and Kettinger et al. 1994), a short term and long term time period was established for each of the operational variables. These were assigned 12 Months and 1-5 Years so as to ensure respondents took into account the same time frames. Dillman (1978) supports this method, arguing that definitive time periods should be included in survey questions.

Third, although questions were included in the survey instrument to allow more extensive analysis and research to be conducted at a later date, Dillman (1978) associates poor response rates with longer surveys despite evidence from Herberlein and Baumgartner (1978) to the contrary. The survey instrument was therefore limited to three pages in order to provide a balance between capturing a rich data set and imposing as little as possible on the respondent.

Instrument Pre-testing

Survey instrument pre-testing is important in mail surveys because the researcher does not have the support of interviews to provide reports on defects and other instrument limitations (Dillman, 1978). Grover et al. (1993) argue that the pre-testing allows a survey to be further refined and thus create a more usable and reliable instrument.

The survey saw three major stages of pre-testing. First, the instrument was presented to senior faculty staff members. The critical areas addressed in this analysis were survey length, question structure and the use of jargon items. The second version of the survey was presented to two local companies whose operations are globally oriented and resulted in changes to industry jargon, the ordering of questions, and elimination of some ambiguity regarding Internet commerce.

Instrument Administration

There is substantial literature concerning survey implementation. Kephart and Bressler (1958) argue that cash inducements may be applied in order to improve response rates. Dillman (1972) advocates the use of cover letters, outlining the survey's purpose, printed with letterheads, and the use of multiple colours to provide contrast, and also endorses reassuring respondents of their anonymity. Miller (1991) and Berenson and Levine (1993) argue that

offering respondents a reward for survey completion may improve response rates. These arguments were considered in the administration of the survey.

The survey was sent to businesses in an envelope bearing the university seal. The envelope contained a copy of the survey, a reply paid envelope, a cover letter and a consent form. Each reply paid envelope was numbered so that respondents could be checked off upon receipt. The cover letter bore the official university letterhead and was signed by a senior member of staff in blue pen, as advocated by Dillman (1972). Respondents were directed to include a business card if they wished to receive a copy of the final report.

Results

The survey was sent in October of 2000, during the prolonged period of online firm bankruptcies that had begun in April of that year (McCausland, 2002). After four weeks, responses slowed. One hundred and twelve responses to the survey were received by that time, a response rate of 19%. Five envelopes were returned empty and three respondents declined to participate in the survey, leaving 104 responses in the dataset. Two missing data items were coded with the mean value for each particular item (Cohen and Cohen, 1983). Analysis across industry groups revealed considerable consistency in proportional representation and showed that no industry was significantly under or over represented.

Response bias analysis was conducted, under the advice of Fuller (1974). One method of examining non-response bias is to compare the responses of earlier respondents to those of later respondents on the basis that later respondents should have similar characteristics to those that did not respond at all (Filion, 1975; Grover et al., 1993). Respondents were split about the mean response date and Pearson Chi-Square analysis of response dates suggested that little, if any, bias existed.

Cronbach Alpha coefficient analysis calculated using five Likert Scale variables (as advised by Srinivasan, 1985 and Doll, 1985) yielded an Alpha of 0.900, suggesting high internal reliability. However, it should be noted that the Cronbach Alpha coefficient is not necessarily an accurate indicator of instrument reliability. Anastasi (1961) argues that test reliability depends on whether the respondent interpreted the question as intended and then responded accordingly. The ability to estimate this through statistical analysis of responses is limited.

Descriptive Statistics

Table 1 provides summary statistics of the responding group.

Table 1: Respondent Demographics

Demographic	Frequency	Percentage

Industry		
Miscellaneous Industrials	18	18.00
Gold	13	13.00
Other Metals	9	9.00
Oil and Gas	7	7.00
Entrepreneurial Investment	7	7.00
Investment and Financial Services	7	7.00
Retail	6	6.00
Media	6	6.00
Miscellaneous Services	6	6.00
Diversified Industrials	5	5.00
Diversified Resources	3	3.00
Banking and Financial Services	3	3.00
Building Materials	2	2.00
Developers and Contractors	1	1.00
Alcohol and Tobacco	1	1.00
Food and Household	1	1.00
Paper and Packaging	1	1.00
Transport Services	1	1.00
Insurance	1	1.00
Property Trusts	1	1.00
Tourism and Leisure	1	1.00
Age of Company		
0 – 2 years	10	10.00
3 – 5 years	13	13.00
6 – 9 years	14	14.00
10 – 15 years	14	14.00
15 – 19 years	11	11.00
20 – 24 years	4	4.00
25 – 39 years	9	9.00
40 – 50 years	1	1.00
51 – 99 years	9	9.00
100 years or more	15	15.00

Number of Employees		
0 – 9	21	21.00
10 – 24	13	13.00
25 – 49	8	8.00
50 – 99	11	11.00
100 – 199	7	7.00
200 – 299	4	4.00
300 – 399	7	7.00
400 – 499	1	1.00
500 – 999	3	3.00
1,000 – 1,499	7	7.00
1,500 – 1,999	3	3.00
2,000 – 2,499	2	2.00
2,500 – 2,999	1	1.00
3,000 – 4,999	6	6.00
5,000 – 9,999	4	4.00
10,000 or more	1	1.00
No Response	1	1.00
Role of Respondent		
IS/IT Manager	31	31.00
Manager	23	23.00
Director	10	10.00
Company Secretary	6	6.00
CIO	5	5.00
Accountant	4	4.00
Administrator	4	4.00
CTO	4	4.00
Financial Controller	4	4.00
CEO	2	2.00
Other	7	7.00

The largest sector represented in the respondent population is Gold, followed by Miscellaneous Industrials and then Oil and Gas, Entrepreneurial Investors, and Investment and Financial Services. The ASX classification system includes companies that are classified into Solid Fuels, Chemicals, and Engineering. These organisations comprise a small percentage of both the ASX and original sample populations; the impact of non-response from these organisations is believed to be minimal.

Brancheau and Wetherbe (1990) found the age of an organisation is positively associated with technology adoption. An examination of responses indicates that organisations of a variety of ages are adopting Internet commerce. Substantial numbers of respondents can be found in both the young and more mature age categories. This may indicate Internet commerce is not confined to organisations of a particular age, consistent with Goode and Stevens (2000).

Table 2 provides descriptive statistics for respondent website applications. The most common website function was promotion and marketing, though servicing existing customers and sales also constituted important activities.

Table 2: Website Function

Demographic	Frequency	Percentage
Fundamental Activity(s) of Website[†]		
Distribute Pricing Information	17	8.21
Obtain Customer Information	15	7.25
Service Existing Customers	36	17.39
Promotional/Marketing Tool	85	41.06

Sales	27	13.04
Shareholders‡	27	13.04
Number of Fundamental Activities per Website		
0‡‡	2	2.00
1	43	43.00
2	29	29.00
3	7	7.00
4	10	10.00
5	9	9.00

† Percentages shown are those of all fundamental activities, and not percentages of respondents.
‡ A number of respondents entered this into the "Other" field.
‡‡ One respondent described the values as "Financial Services". The other failed to give details.

Many respondents noted their website performed more than one fundamental activity. This indicates that the implementation of Internet commerce can take many forms, consistent with Applegate et al. (1996). The limited number of organisations offering sales or purchasing facilities is consistent with Liu et al. (1997) who found that just over a quarter of Fortune 500 companies provided such facilities.

Hypothesis Testing

Table 3 presents the results of hypothesis testing. One-sided Student t-tests were used to test Likert-scale responses, as in Alexander and Rudd (1984). Two conditions must be satisfied before the hypothesis can be accepted. First, the proportional representations must indicate a statistically significant number of companies expecting a particular change in their business conditions and, second, the direction of significance must be equivalent to that of the hypothesis.

Table 3: Hypothesis Testing for Twelve Month and Five Year Periods

Hypothesis	Factor	12 Months				5 Years			
		Mean	t	p value	Result	Mean	t	p value	Result
H1	Competitive Advantage	3.53	5.100	.000	Accepted	3.64	5.575	.000	Accepted
H2	Remove competitive disadvantage	2.98	-.167	.434	Rejected	3.03	.261	.397	Rejected
H3a	Customer communication	3.52	3.414	.000	Accepted	3.99	6.461	.000	Accepted
H3b	Supplier communication	2.36	-4.434	.000	Rejected	3.08	.516	.304	Rejected
H3c	Shareholder communication	3.69	4.792	.000	Accepted	4.17	9.345	.000	Accepted
H3d	Competitor communication	2.49	-3.636	.000	Rejected	2.84	-1.045	.150	Rejected
H4a	Overall organisation costs	2.89	-1.032	.152	Rejected	2.76	-2.105	.019	Rejected
H4b	Recruiting staff costs	1.72	-9.926	.000	Rejected	2.57	-4.141	.000	Rejected
H4c	Marketing service range costs	2.68	-2.700	.004	Rejected	2.63	-2.656	.005	Rejected
H4d	Marketing product range costs	2.85	-1.261	.105	Rejected	2.72	-1.997	.025	Rejected
H5	Add new functionality	2.93	-.453	.326	Rejected	3.53	3.234	.001	Accepted

Discussion

Competitive Advantage

Australian companies evidently expect to gain an advantage over their competitors from Internet technology adoption, consistent with Porter and Millar (1985) and Earl (1987). Anecdotal evidence provides some insight into the nature of this advantage. One respondent noted, "Our 'clicks and mortar' approach will give us an advantage over the virtual retailer". Another argued, "Our web page should develop over time to give further service and added value to the shareholders and hopefully provide a better service to our shareholders than other competing companies in our industry". This highlights the transient nature of advantages that may be derived, a view supported by Kettinger et al. (1994).

Competitive Disadvantage

Apparently Australian companies do not expect to reduce competitive disadvantage in the marketplace through Internet technology adoption. This conflicts with Swanson (1994) and Teo et al. (1998), who argue that organisations may adopt a technology to reduce a competitive disadvantage. Fichman and Kemerer (1997) associate removal of a competitive disadvantage with "followers" in the adoption process. The rejection of H2 appears to support this interpretation. For example, one respondent noted that they could only effectively remove a competitive disadvantage if their technology were better than that of their competitors, implying fairly general adoption as the conditions in which this is possible. Another noted the transient nature of the benefits they expected to derive: "Over time competition will increase and most advantages held by competitors will be reduced".

Communication

Evidently, after the "tech wreck", managers do not expect to improve communication with suppliers and competitors through Internet commerce adoption. This result contradicts theory proposed by Swanson (1994) and Earl (1989). Perhaps existing methods involving regulators, internal and other communication channels are perceived as sufficient in this regard. However, managers do perceive significant benefits in Internet commerce adoption for shareholder and customer communication. Despite the tech wreck, respondents apparently still expect and value the potential for communication within these groups.

Costs

Rejection of H4a-d shows managers do not expect to reduce operating costs from Internet commerce adoption. This result is contrary to literature arguments that organisations can gain significant efficiency and effectiveness advantages from the adoption of technology. For example, Tan and Teo (1998) found lowering operational costs to be a significant motivator for Singaporean organisations adopting the Internet.

One possible explanation for this cost reduction result may be the inability of organisations to quantify adoption costs, consistent with Schneider and Perry (2000). In particular, the high rate of technology change means that organisations will be limited in their ability to quantify adoption, conversion and integration costs in terms of future expenditure. Stylianou et al. (1996) discuss similar issues with regard to corporate mergers and acquisitions, while Robbins and Stylianou (1999) discuss the impacts of post-merger acquisition on information systems capabilities.

Functionality

Finally, managers do not expect to improve functionality through Internet commerce adoption, at least in the near term. This result conflicts with theory presented by Norton and Bass (1987) who argue that technology adoption allows organisations to garner increased functionality from *existing* resources.

The principal activities of the sample organisation may be the cause this divergence. A substantial number of respondents were industrial and extractive sector organisations. These may receive limited increases in functionality from the adoption of Internet commerce, as their products and output are primarily larger non-information intensive material items such as steel, oil and gas or minerals. Manufacturing and industrials comprised 50% of respondents, which may limit the expectation of organisations when adopting Internet commerce, consistent with Bretschneider and Wittmer (1993) and Premkumar and King (1994). Additional analysis examined improved functionality with respect to industry classification but the results were all still not significant at the five percent level for the 12-month period.

Overall Assessment

The results of this study are only partially in accord with the drivers for Internet e-commerce technology adoption derived from the literature. Gaining competitive advantage, communicating with customers and shareholders, and increased functionality in the longer-term all feature as significant expectations from adopting Internet e-commerce technology. However, cost reduction (of any sort) is notably absent as an expectation from such adoption. This suggests that, after the "tech-wreck" of 2000, managers of Australian firms still see the potential for Internet e-commerce to deliver them business benefits but these are perceived to lie in better performance delivered through improved customer-related communication, services and functionality rather than internal or "back-end" value chain process improvements leading to cost reductions. This in turn is perhaps not only a reaction to the bursting of the dot-com bubble but a reflection of an increasing scepticism, developed over the longer term, of the potential for IT in general to deliver cost reductions as opposed to enabling improvements to, and permitting the development of new types of, business activity.

Limitations and Further Research

The results are subject to a number of limitations. First, the study is an analysis at a single point in time. The managerial expectations found for Internet e-commerce technology adoption may, therefore, be tied to the particular time from which the results are drawn. Repetition of the study might improve result reliability and robustness. Additionally, Internet commerce adoption was examined using a limited number of Australian publicly listed companies. Further, Australian companies may idiosyncratically adopt technology for as yet undiscovered reasons (although this would seem unlikely). Application of this study to another population might enhance the findings of this study.

The study also opens several avenues for further research. First, given the discrepancy with extant literature, the study begs for replication in another region. Additionally, an analysis of the extent to which the managerial expectations reported here have been realised would make for interesting and useful research. Further variable refinement is also warranted.

Conclusion

This study aimed to address the research question:

What are the post "tech-wreck" managerial motivations for Internet technology adoption by Australian firms?

Analysis of the literature elicited five principal non-exclusive drivers for Internet e-commerce technology adoption: gaining a competitive advantage, removing a competitive disadvantage, improving communication throughout the value-chain network, productivity improvement, and increasing functionality from existing resources. However, of these, only competitive advantage, improved communication (with customers and shareholders) and new functionality were found to be supported in the expectations of managers of Australian companies, perhaps indicating some increased scepticism regarding at least some of the business benefits that have previously been argued to be obtainable with this new technology.

The study makes two main contributions to the research literature. It has investigated a still very new technology that has received scant investigation thus far, particularly at a time of especial interest: post the dot-com "tech wreck" of 2000. Second the approach taken is one that examines business-derived managerial motives for technology adoption (Internet e-commerce related in this case), another area that, for Information Systems in general, has received only limited attention.

The advent of Internet commerce and other electronic commerce media has caused great enthusiasm and interest from research and other communities but the immaturity of the technology has limited the amount of research that has been conducted. This study applied traditional Information Systems theory to provide an initial investigation into Internet commerce. The approach will facilitate greater understanding of Internet commerce, and also promote improved refinement of the more traditional theoretical concepts that were applied. This study also promotes an understanding of where Internet commerce may reside in the classification of information systems.

Application of similar instruments to other technologies will allow researchers to gain greater understanding of business managerial motivations for adopting technology. A greater understanding of the business motivations will allow researchers and practitioners to not only understand organisational processes but to assist in the development and implementation of business oriented technologies.

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Appendix – Survey Instrument

Section 1: Organisation Details

1. What is your job title? _____
2. How long have you been employed in the organisation? _____
3. How many people does your organisation employ (fulltime)? _____
4. What is the organisation's primary business activity? _____
5. In what year was the organisation founded? _____
6. Please indicate if your organisation currently uses or intends to adopt the following in the next 12 months (tick all that apply):

	In Use	Adopt		In Use	Adopt
WAP			Macintosh, Version _____		
XML			MS Windows, Version _____		
Telecommuting			Linux, Version _____		
EDI			Other: _____		

7. Have you considered open source technologies? Yes No
   If Yes which technologies?_____

   If No why not? _____

Section 2: Website Characteristics

8. How long has the organisation had a website? _____
9. What were the total costs incurred in the website's development?

Less than $25,000	$50,001 - $75,000	$100,001 - $125,000	$150,001 - $175,000
$25,001 - $50,000	$75,001 - $100,000	$125,001 - $150,000	$175,001 or more

10. Where is the website hosted?

Internally hosted Externally hosted Other: _____

11. What is/are the fundamental activity(s) of the website (tick all that apply):

Distribute pricing information	Service existing customers	Sales
Obtain customer information	Promotional/marketing tool	Other: _____

12. The motivation for the website adoption was (tick the most important reason):

To be the first to develop and introduce
A defensive move aimed at countering an existing threat
Other: _____

13. Did you use formal analysis techniques in the decision to adopt a website? Yes No
If Yes which techniques? _____

14. What was the time period between the first consideration of a website and the decision to adopt the website? (excluding website development) _____

15. How long did the website development take?_____

16. To what extent, if any, did the following factors contribute to the adoption of a website: (1= no contribution, 3= partial contribution, 5 = full contribution)

Top management	1	2	3	4	5	N/A
Information Technology department	1	2	3	4	5	N/A
Cost of recruiting, hiring and training staff	1	2	3	4	5	N/A
Customers	1	2	3	4	5	N/A
Suppliers	1	2	3	4	5	N/A
Shareholders	1	2	3	4	5	N/A
Observation of competitors	1	2	3	4	5	N/A
Others _____	1	2	3	4	5	N/A

Section 3: Adoption Considerations

Please consider the following questions with regards to both a short term (less than 12 Months) and a longer-term perspective (1- 5 Years).

17. How significant were changes to the following abilities significant in adopting a website? (1= totally insignificant, 3= no effect, 5 = highly significant)

	12 Months						*1 – 5 Years*					
	1	2	3	4	5	N/A	1	2	3	4	5	N/A
Development of new products												
Development of new services												
Distributing information												
Facilitating internal organisational communication												
Development new functionality for existing services												

18. How significant was communication with the following groups significant in the decision to adopt a website? (1= totally insignificant, 3= no effect, 5 = extremely significant)

	12 Months						*1 – 5 Years*					
	1	2	3	4	5	N/A	1	2	3	4	5	N/A
Customers												
Suppliers												
Shareholders												
Competitors												
Regulators												

19. When adopting the website to what degree, were you expecting a change in the costs associated with the following activities? (1= significant reduction, 3= no effect, 5 = significant increase)

	12 Months						*1 – 5 Years*					
	1	2	3	4	5	N/A	1	2	3	4	5	N/A
Managing relationships with customers												
Managing relationships with												

suppliers	
Managing relationships with shareholders	
Recruiting, hiring and training staff	
Marketing the company's product range	
Product distribution	
Marketing the company's service range	
Service implementation	
Overall organisational costs	

20. Did you believe adopting a website would provide your organisation with an advantage over your competitors? (1= totally disagree, 3= no effect, 5 = totally agree)

12 Months						*1 - 5 Years*					
1	2	3	4	5	N/A	1	2	3	4	5	N/A

Comments:_____ Comments:_____

21. Did you believe adopting a website would reduce an advantage held by your competitors before you adopted? (1= totally disagree, 3= no effect, 5 = totally agree)

12 Months						*1 – 5 Years*					
1	2	3	4	5	N/A	1	2	3	4	5	N/A

Comments:_____ Comments:_____

Notes

The adoption related questions in the survey instrument were adapted from appropriate literature sources. These sources were:

- Question 18: Poon and Swatman (1999(a))
- Questions 17, 19, 20, 21: Sethi and King (1994).